IOWA DEPARTMENT OF NATURAL RESOURCES

Underground Storage Tank Section

GUIDANCE DOCUMENT

Underground Storage Tank Closure Procedures
for
Tank & Piping Removal

Iowa Department of Natural Resources
Underground Storage Tank Section
502 East 9th Street
Des Moines, IA 50319-0034
515/281-4367

www.iowadnr.wmad.org

JULY 2001

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STEPS TO SUCCESSFUL UST CLOSURE

Underground Storage Tank & Piping Removal Checklist

STEP 1 - Notification of Intended UST Closure Activity

[ ] Send DNR Form 542-1308 "Notification of Closure/Change-in-Service" to this department.

- DNR Form 542-1308 must be filled out COMPLETELY, ACCURATELY and SIGNED by the owner or Responsible Party.
- DNR Form 542-1308 must be received by this department AT LEAST 30 DAYS BEFORE closure of the tanks is scheduled to take place.

STEP 2 - Preparatory Activities

[ ] Confirm the availability of those contractors you may be using on the anticipated closure date. Notify DNR of any changes to the date of closure for your UST system.

[ ] Notify your laboratory of the types of samples you will be needing and request the necessary sample containers. Testing for petroleum products shall be conducted by methods OA-1 and OA-2. Copies of these methods are available form the DNR.

[ ] Obtain the necessary sampling equipment and packing materials to store the samples at approximately 40 degrees Fahrenheit after collection and during shipment. Samples must be received by the laboratory within 72 hours of collection.

STEP 3 - Oral Confirmation of Closure Date

[ ] Contact (telephone) the DNR field office 24 hours prior to actual closure to confirm the removal date.

STEP 4 - UST Closure Activities

Sampling Procedures and Tank Removal are explained in greater detail on the following pages.

[ ] Remove all contents from the UST and dispose of according to DNR's solid waste rules.

[ ] Disconnect all piping. Purge the tank and UST site area of combustible vapors. Monitor the site continuously with a combustible gas indicator. (See Section II, Item 1)

[ ] Clean and remove the UST as prescribed in API recommended practice #1604 "Removal and Disposal of Used Underground Petroleum Storage Tanks."

[ ] Conduct the soil and water sampling according to the procedures in Section II of this document. **If contamination is found during soil or groundwater sampling, you must contact the DNR (Section I, Item 2, Reporting Contamination) and report the contamination. Closure operations will cease and you will be given new guidance for the closure of your UST site.**

[ ] Ship soil samples to an Iowa certified laboratory within 72 hours of collection.

STEP 5 - Closure Report

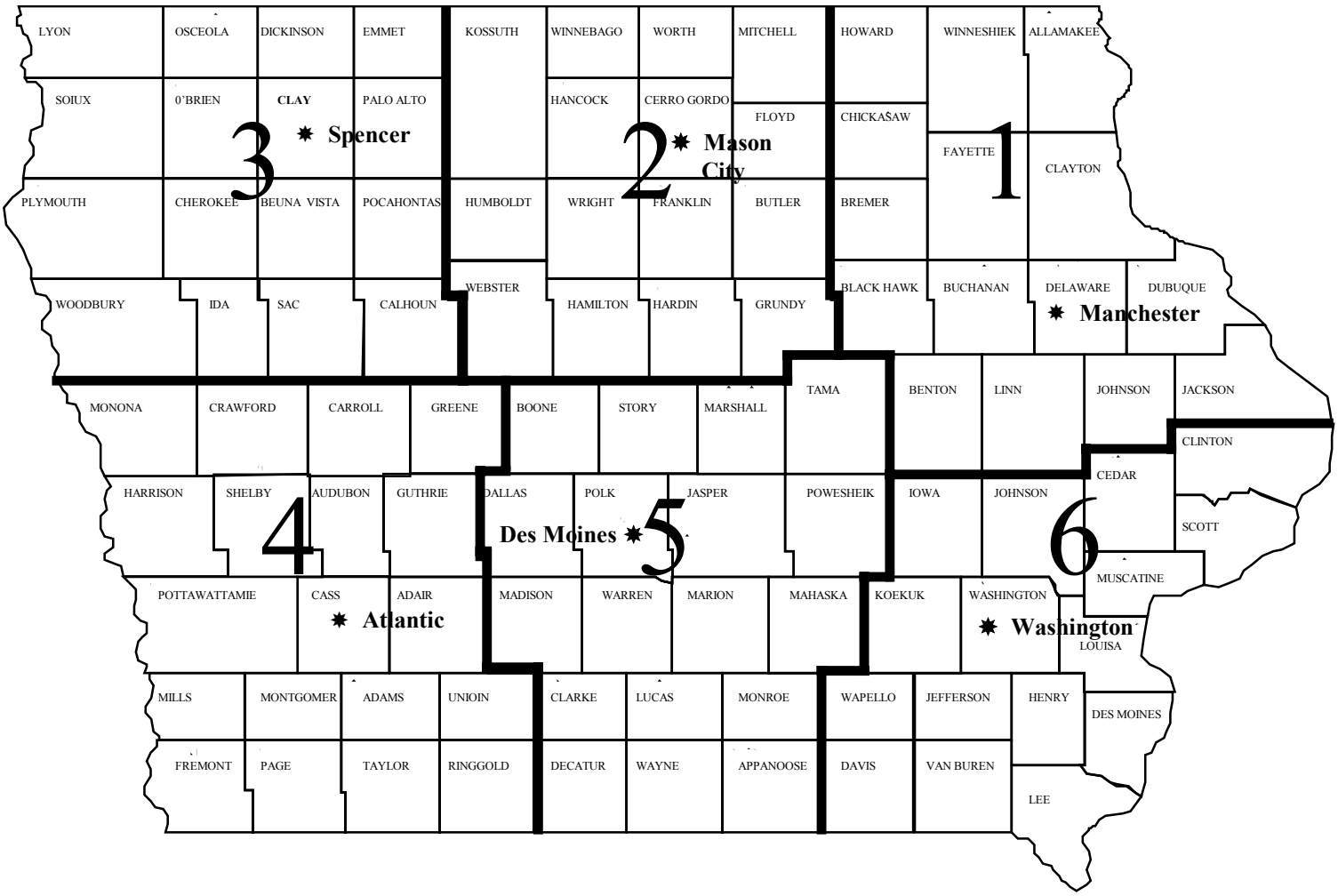
Approved external leak detection equipment in use for 90 days prior to closing date may satisfy the sampling requirements

[ ] Within 45 days of the tank or piping removal submit a copy of the closure confirmation report (Section IV, Item 3) and the metal tank registration tags to the DNR. A copy of all reports and drawings must be maintained by the owner/operator for at least three years.

[ ] Written confirmation of receipt of the closure report will be mailed to the owner after all these items have been received and reviewed by the department.

Iowa Department of Natural Resources

Environmental Protection Division
Field Offices



Field Office 1 — **Manchester**, IA 52057
909 West Main, Suite 4
319.927.2640
FAX: 319.927.2075

Field Office 2 — **Mason City**, IA 50401
2300 15th Street, SW
515.424.4073
FAX: 641.424.9342

Field Office 3 — **Spencer**, IA 51301
1900 N Grand Avenue, Box 4086
712.262.4177
FAX: 712.262.2901

Field Office 4 — **Atlantic**, IA 50022
1401 Sunnyside Lane
712.243.1934
FAX: 712.243.6251

Field Office 5 — **Des Moines**, IA 50309
401 SW 7th, Suite 1
515.725.0268
FAX: 515.725.0218

Field Office 6 — **Washington**, IA 5253
1004 W. Madison
319.653.2135
FAX: 319.653.2856

IOWA DEPARTMENT OF NATURAL RESOURCES

UNDERGROUND STORAGE TANKS (UST)

UNDERGROUND STORAGE TANK AND PIPING REMOVAL - Guidance Document

This document provides underground storage tank (UST) owners with an approved procedure for closing an UST by removal of the tanks and attached piping. It is intended to help owners and operators of USTs comply with federal and state rules concerning permanent closure of their UST system. This document is not intended to be an in-depth explanation of the rules governing UST systems. Underground storage tanks that were last used before January 1, 1974, are not required to comply with closure requirements unless there is evidence of a release of product from the tanks, or product has been in the tank after January 1, 1974. To claim this exemption, an UST owner must submit to the department affidavit "January 1, 1974 Exclusion" (attached). However, for the benefit and protection of the owner, it is recommended that tanks not used since January 1, 1974, be closed by an acceptable method.

REFERENCES

The following publications are referenced in Chapter 567--135 IAC "Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks" and should be used as guides for further assistance in the closure process.

A) American Petroleum Institute Recommended Practice 1604, "Removal and Disposal of Used Underground Petroleum Storage Tanks."

B) American Petroleum Institute Publication 2015, "Cleaning Petroleum Storage Tanks."

C) American Petroleum Institute Recommended Practice 1631, "Interior Lining of Underground Storage Tanks."

D) The National Institute for Occupational Safety and Health "Criteria for a Recommended Standard...Working in a Confined Space"--may be used as guidance for conducting safe closure procedures at some hazardous substance tanks."

E) NFPA 326, "Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning or Repair," 1999 Edition.

Address all correspondence and questions to

IOWA DEPARTMENT OF NATURAL RESOURCES
UNDERGROUND STORAGE TANK SECTION
502 East 9th Street
DES MOINES, IA 50319-0034

OR CALL

515/281-4367

SECTION I - REPORTING REQUIREMENTS

1) Underground Storage Tank Notification of Closure or Change-in-Service:

Underground Storage Tank Closure Notification Form number 542-1308 must be filed with the Department of Natural Resources at least 30 days prior to beginning closure activities. Acknowledgment and a determination of the appropriate closure date will be mailed to the filer of form 542-1308 within 15 days of receipt by the department. The local DNR field office must be contacted concerning any change in actual closure date. **Oral confirmation of the closure date must be given (telephoned) to the local field office 24 hours prior to actual closure.**

2) Reporting Contamination:

WHEN EVIDENCE EXISTS INDICATING THERE HAS BEEN A RELEASE TO THE ENVIRONMENT AT THE SITE OF CLOSURE OF THE TANK OR PIPING, the contamination must be reported to the Department within 24 hours of discovery. This report should be reported by telephone to 515.281.4367 or by fax to 515/281-8895.

WHEN AN IMMEDIATE THREAT EXISTS IN CONJUNCTION WITH THE CONTAMINATION, SUCH AS:

A) explosive conditions are present due to the contamination,
B) public or private drinking water supplies are threatened, or
C) an immediate danger to life or health exists due to contamination.

This contamination must be reported to the Department of Natural Resources within 6 hours of discovery. Reports can be made by phone to 515.281.8694. This phone number is only to be used for reporting when an immediate threat such as described above is present. Upon receiving the report, the Department will provide further direction.

3) Overexcavation

If contaminated soils are discovered while assessing a site at closure, owners and operators may remove up to one foot of the native soils surrounding the tank pit. The contamination and overexcavation must be reported to the department prior to backfilling the excavation. A soil sample must be collected and laboratory analyzed from the area showing the greatest contamination.

4) Closure Confirmation Report

A closure confirmation report must be submitted to the department within 45 days after the tank or piping removal.
Refer to pages 9-10, Section IV, Item 3 for a complete list of what to include in the closure report.

5) Disposition of Contaminated Soil, Debris and Groundwater:

Refer to page 8, Section III.

6) Storage and On-Site Maintenance of Records:

Records (including maps, correspondence, boring/well logs, monitoring results), copies of laboratory results and any other pertinent information received or generated as a result of closure activities must be maintained on site or at a readily available alternative site for at least three years after the closure has been completed, and made available to the inspector from the DNR during the inspection.

PLEASE NOTE: The Underground Storage Tank site records maintained by the Department of Natural Resources will not reflect changes due to closure activities until all reporting requirements have been met by the UST owner or operator.

SECTION II - SAMPLING & ANALYSIS

1) Sampling Exemption

If approved external leak detection equipment has been in place for the affected UST system for a minimum of 90 days prior to the date of receipt of the closure notice by the DNR, the equipment is operational, and the required monitoring and records have been maintained, the soil and groundwater sampling requirements may be satisfied by submitting to the department: 1) form 542-1308 (Notice of Closure or Change-in-Service) 2) complete record of the monitoring results (minimum 90 days), 3) the specifications of the monitoring equipment, 4) monitoring method used, 5) verification that no release to the environment has occurred by providing a notarized statement from the owner to that effect (attached).

2) Soil Sampling

Equipment Needed:

- Auguring tool capable of boring to a depth of two feet below the bottom of the tank for sampling purposes; and
- Sample Containers with Teflon septa-lined lids obtained from the certified lab to which the samples will be submitted for analysis

OR

- Soil Sampler Kit containing a soil sampling tube with a removable rigid acetate liner. The sample tube must be at least 18" long and capable of removing a soil core of at least 0.9 inch diameter. (**Contact your certified laboratory for information on sampling equipment and containers.)**
- Equipment to maintain samples at approximately 40 degrees Fahrenheit until delivery to the certifed laboratory within 72 hours.

Procedure:

(1) PURGE the tank and surrounding areas of all vapors, monitoring with a combustible gas meter throughout the operation. When the tank must be entered, an oxygen concentration-indicating meter is highly recommended. A tank should not be entered if the reading is less than 19.5 percent free oxygen.

(2) CLEAN and REMOVE the underground tank and its connected piping in accordance with the recommended practices referenced on page three of this document. Dispose of any waste products in a manner consistent with Section III-Waste Product Treatment & Disposal. Place the tank on a level surface and use wood blocks to prevent movement of the tank until removed from the site.

(3) Observe the tank and piping excavation area. If contamination is evident at the base of excavation or the sidewalls, Contact the department at 515/281-4367.

(4) Sample the floor of the tank excavation between one and two feet into native soils (See Addendum A). If sand, rock or highly permeable soil is encountered while boring the sampling holes, begin boring outside the excavation. The boring shall continue until low permeable soils or groundwater are reached (see item number 2, paragraph 4, page 6).

WHEN A CONCRETE PAD INTERFERES WITH SAMPLING BENEATH THE UST. If the UST is resting on a concrete pad, and the pad is to be left in the ground, soil samples must be collected from around the concrete pad according to close in place procedures (see Addendum B, page 12).

(5) Sample the floor of the piping excavation every ten lineal feet, from one to two feet into native soil.

(6) Soil Sampling Options

A. Sampling Soil Kit (soil sampling tube with acetate liner)

Using the soil sampling kit, collect a sample from the base of the sampling holes. Insert a rigid acetate liner into the soil sampling tube by pushing the sampling tube at least two-thirds of the way into the soil. The sample should be collected by one of the following methods in the tank excavation.

Strap or bracket the sampling tube with liner to a backhoe bucket and use the bucket as a lever to push the tube completely into the soil for sample collection; or

With the backhoe, collect a full bucket of soil from the bottom of the excavation. Insert the sampling tube and liner at least two-thirds of the length into the top center area of the bucket. The "T-handle" with the sampler kit may have to be attached to the tube to collect the sample.

If the tank excavation must be physically entered in order to obtain samples, the tank owner must follow the OSHA requirements pertaining to shoring or sloping of the excavation walls.

Remove the acetate liner containing the soil sample and cut off any excess liner not containing soil. Immediately cap each end of the liner with caps provided and seal the caps with friction tape. If the liner does not contain at least two-thirds of the original liner length, repeat the sample collection.

B. Sample containers with Teflon septa-lined lids.

For samples collected in glass containers, the appropriate containers must be obtained from the laboratory doing the analyses. The soil must **always** be compacted into the container tightly with the soil filling the container completely. No void spaces should be visible in the container and the lid must be secured tightly. **A minimum of one sample container per sampling point is required. Additional containers per sampling point may be required by the laboratory.** Since sample collection may be difficult from deep excavations, soil cuttings from the tip of the auger may be placed in the lab containers when such difficulties are encountered.

Label each sample as it is identified on the dimensional drawing. Indicate the facility name, tank owner, date and the substance stored in the underground tank. Maintain the samples at approximately 40 degrees Fahrenheit but do not allow the samples to freeze.

(8) Prepare the samples for delivery to the laboratory by placing the containers (with samples) into an iced cooler or chest for shipment at approximately 40 degrees Fahrenheit. If the acetate liner/sample does not fit entirely into the cooler, the liner/sample may be cut, provided the liner/sample is clearly labeled identifying the sample orientation (i.e., top and bottom of original sample) in order that the laboratory may analyze the appropriate portion of the sample. Samples must be shipped to insure their arrival at the laboratory within 72 hours of collection.

3) Groundwater Sampling

Equipment Needed:

- Augering tool or drilling rig capable of boring to groundwater. The boring must be done by a certified well contractor according to Chapter 567--82(455B) Iowa Administrative Code except that a person may construct or reconstruct a well, on their own property without being certified. Local health codes may also require a well construction permit.
- A clean, commercially manufactured bailer that is transparent and suitable for the substance stored in the tanks.
- Several sampling containers with screw top Teflon-lined lids obtained from the certified laboratory to be used.
- Equipment to maintain samples at approximately 40 degrees Fahrenheit during collection and delivery to laboratory.
- Scrub brush, detergent and a supply of distilled water.

Procedure:

(1) After removal of the tanks, observe the tank excavation area before proceeding with groundwater sampling. If contamination is evident at the excavation's base or the sidewalls, call the department at 515-281-4367.

IF BEDROCK IS ENCOUNTERED BEFORE GROUNDWATER, SEE ADDENDUM E, PAGE 15.

(2) Sampling of groundwater must be done outside the tank excavation or tank cluster via at least one borehole or monitoring well downgradient but within 20 feet of the excavation (See Addendum C). For a tank cluster, the borehole should be at the midpoint of the side downgradient of the cluster.

(3) Draw a dimensional overview of the tank excavation area indicating the position of the boreholes. Tank Cluster refers to an installation containing more than one tank where the separation distances between the tanks are less than or equal to ten (10) feet.

(4) If, after boring greater than ten feet below the lowest point of elevation of the tank excavation site, groundwater is not encountered and sands or highly permeable soils are not present, a groundwater sample may not be required. See Addendum D for detailed information.

(5) Develop the monitoring well by allowing the bailer to fall freely through the borehole until it strikes the surface of the water. Immediately after the bailer fills, rapidly withdraw the bailer. Check the sample for free product. If present, see the next item number (6). If no product or sheen is observed, repeat until the sample is free from dirt and fine sands. Any other methods for monitoring well development are not recommended.

(6) Collect a sample of the water by lowering the bailer into the borehole until it is just under the water's surface. Remove the bailer and check for free product/sheen floating on the sample's surface. If sheen or free product is observed, contact the DNR at 515.281.4367. If no sheen or free product is observed, pour a portion of the water collected from the bailer into the sampling containers provided by the laboratory.

(7) Label the water sample according to the dimensional drawing and include on the label the date, facility name, tank owner's name, and substance stored in the tank. Fill each container so that there is no air space in the vial but do not overfill. Secure the lid on each container after filling. Repeat the sampling procedures above for each borehole if more than one borehole is drilled downgradient of the tanks. If a disposable bailer is not used, the bailer must be thoroughly cleaned with soap and detergent, and rinsed with distilled water prior to sampling each additional borehole.

(8) Prepare the samples for delivery to the laboratory by placing the containers into an iced cooler or chest maintained at approximately 40 degrees Fahrenheit. Samples must be shipped to the laboratory within 72 hours of collection.

(9) After the boreholes or wells are no longer in use, fill from bottom to top with neat cement or bentonite products, unless the hole seals itself by removing the casing.

4) Laboratory Procedures for Testing Soil and Groundwater Samples:

Soil Samples

Soil samples must be analyzed for high volatile petroleum compounds (gasoline) with each concentration reported separately (benzene, ethylbenzene, toluene, xylene) using analytical Method OA-1 regardless of the product stored in the tank. If any grade of diesel fuel, fuel oil, kerosene, oil, and mineral spirits had ever been stored in the tank, soil samples must be analyzed for Total Extractable Hydrocarbons using Method OA-2. If there is a history of use other than gasoline or if it is unknown whether any product other than gasoline was stored in the tank, soil samples must be analyzed for Total Extractable Hydrocarbons using Method OA-2.

Water Samples

Water samples must be analyzed for benzene, toluene, ethylbenzene and xylene using analytical method OA-1. If any grade of diesel fuel, fuel oil, kerosene, oil, and mineral spirits had ever been stored in the tank, groundwater samples must also be analyzed for Total Extractable Hydrocarbons using Method OA-2. If there is a history of use other than gasoline or it is unknown whether any product other than gasoline was stored in the tank, groundwater samples must be analyzed for Total Extractable Hydrocarbons using Method OA-2.

Non-petroleum Substances

For tanks containing non-petroleum, regulated substances, the substance and its breakdown constituents must be analyzed using the appropriate EPA and DNR approved analytical methods.

Contamination Corrective Action Levels

	Soil (mg/kg)	Groundwater (ug/L)
Benzene	0.54	5
Toluene	42	1,000
Ethylbenzene	15	700
Xylene	No Limit	10,000
Total Extractable Hydrocarbons (TEH)	3,800	1,200
TEH (Waste Oil)	not established	400

SECTION III - WASTE PRODUCT TREATMENT & DISPOSAL

SOLIDS: [4]

Solids which exceed the minimum standards of the Department of Natural Resources for contamination can be treated and disposed of by using either one or a combination of the following disposal methods:

(1) Land application of the solid material. Prior to land-applying contaminated solids, "Notification Form for Land Farming Petroleum Contaminated Soil" with a contour map of the application area must be submitted to the Department [567--121.3(2) IAC].

Restrictions-
1) Maximum application rate--four inches thick or 500 tons/acre/year.
2) Slurries or semi-solids cannot be land-applied.
3) Separation Distances; wells--500 feet; residences--200 feet; streams, lakes, ponds, sinkholes, tile intakes--200 feet.
4) Application on frozen or snow-covered ground is restricted to application rates under 1/4 inch thick.
5) Slope class cannot be greater than 5% and mechanical incorporation within 48 hours is required when application exceeds 1/4 inch.
6) Acceptable Soil Conditions must be a minimum of six feet above bedrock.
7) Site specifications may necessitate environmental sampling.
8) Records must be maintained on premises in compliance with (567--121.3(2) IAC) for a period of at least five years.

PLEASE NOTE: For Complete Details, Request Guidance and Notification Form For Land Farming From This Department.

(2) Landfill Disposal of the solid material is a second alternative. Solid wastes may be disposed of in a local sanitary landfill provided the landfill management agrees to accept the waste, and the disposal does not violate the conditions of the landfill permit as regulated by chapters 567--100 through 110 of IAC. The landfill should be contacted prior to delivery of the waste products to the landfill. Liquids and semi-solids cannot be disposed of in a sanitary landfill. Additional information may be obtained by calling the Solid Waste Section of the Department of Natural Resources.

(3) Alternative Methods for treating and disposal of solid waste materials must comply with state requirements (Chapter 567-100 through 110 IAC) and it must be approved by this department prior to utilization.

LIQUID AND FLOWABLE WASTE PRODUCTS: [4]

Remove liquids and flowable wastes from the UST system, utilizing explosion-proof or air-driven pumps. Pumps, motors, and hoses must be grounded to prevent any explosion hazards due to sparks. Contents must be removed so that no more than one inch of material remains within the UST. The area must be vapor-free for the use of suction apparatus.

Once contents are removed, all free product must be separated from the balance of the waste and recycled or re-processed in a manner that is allowable by law. The remaining product can be disposed of as follows:

1) Ship to an individual or firm authorized to receive and neutralize or destroy the waste product, or
2) Solidified in a manner approved by the department and disposed of as described above for solid wastes.

A liquid waste product cannot be discharged upon or into the ground or a water of the State without prior approval by the Iowa Department of Natural Resources (567--64.3(1) IAC). If the recipient of the waste operates under an NPDES permit issued by this department, a copy of the NPDES holder's agreement to accept the waste material from the UST owner must be delivered to this department prior to disposal of the waste material.

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[4] The contents of the tank may be subject to regulation as a hazardous waste as defined by CFR Section 302(4). For information on these regulations contact the RCRA HOTLINE at (800) 424-9346.

SECTION IV - UST TANK DISPOSAL & CLOSURE COMPLETION

(1) Tanks should be labeled prior to removal from the site. Regardless of the tank condition, the label should contain a warning against certain types of reuse. The label should be in legible letters at least two inches high similar to the following:

TANK HAS CONTAINED GASOLINE
NOT VAPOR FREE
NOT SUITABLE FOR STORAGE OF FOOD OR LIQUIDS INTENDED FOR HUMAN OR ANIMAL CONSUMPTION
DATE OF REMOVAL: 7/27/96

(2) Tanks should be transported from the UST site on the day of removal. The tank should be checked with a combustible gas indicator. It should be below the 20% of the lower flammable limit. Secure the tank on a truck for transportation to the storage or disposal site with the 1/8-inch vent hole (installed prior to extraction, "API Recommended Practice 1604") located at the uppermost point of the tank.

This department encourages tank owners to use the following options for underground storage tank disposal:

A) Salvage the metal and dispose of accordingly for scrap metal observing all precautions for health and safety concerns.

B) Reuse of the tank in an acceptable manner with products compatible with the cleaning process utilized. Underground storage tanks cannot be used to store a regulated substance above ground since they were not designed for above ground use.

C) The very last resort is disposing the tanks at a permitted landfill provided the landfill will accept them.

(3) Within 45 days of tank or piping removal, a closure report form must be submitted to the department. The form is included with this guidance material. You may obtain extra copies of the closure form through our web site **(www..iowadnr.wmad.org)**, or by calling the department at the number on the front cover page or by calling the field office in your region. **The closure report must include:**

1. Brief narrative including:
   a) site description/location, date of tank/piping removal, number of tanks removed
   b) identification of owner and contractors
   c) brief description of 1) condition of tank/piping, 2) disposition of tanks, 3) sampling locations, 4) sidewalls and bottom of tank pit/piping trench, disposal/treatment of backfill
   d) summary of analytical results
   e) waste product treatment/removal
2. Dimensioned diagram of site which includes:
   a) location, size and contents of all USTs; piping location and lengths, locations of pump islands
   b) sampling locations/identification that correspond to the lab reports
   c) boring/monitoring well locations
   d) location of buildings and above ground tanks and piping on the site (include size and contents of ASTs)
   e) groundwater flow direction
   f) reference direction
   g) scale of the diagram in feet
   h) location of underground utilities within 100 feet of the site (e.g., sanitary sewers, power lines, storm sewers, utility trenches, water lines, pipelines, etc.)
3. Stratigraphic logs of the boreholes and construction details of the well if installed, and disposition of the monitoring wells after sampling.
4. Certified laboratory analytical results for each sample, including completed chain of custody form(s).

5. The location of the excavation pit boundaries
    a. dimensioned diagram of excavation pit area, indicating depth to the bottom of each tank and the dimensions of overexcavated area
    b. sampling locations after overexcavation
    c. soil disposal/treatment

6. Other documentation
    a. tank cleaning/disposal (e.g., signed statement from the party who performed the cleaning service indicating the UST is clean, and a certificate of disposal
    b. soil disposal
    c. documentation of sludge/wastewater disposal (e.g., signed statements, copies of permits)

ADDENDUM A

Soil Sampling Locations and Distances (Closure by UST Removal)

Tank Capacity (gallons)	# of Samples	Location	Example ("**X**" location of sample)
1,000 or less	1	center of tank	<------ a' ------> **X** <----- a' ----->
1,001 to 8,000	2	1/3 from ends	<---- a' ----> **X** <--- a'----> **X** <--- a' ---->
8,001 to 30,000	3	5 feet from ends and at the center	<---5'---> **X** <----a'----> **X** <----a'----> **X** <---5'-->
30,001 to 40,000	4	5 and 15 feet from ends	<----------15'----------> <----------15'----------> <---5'---> <---5'---> **X** **X** **X** **X**
40,001 or greater	5	5 and 15 feet from ends and at center	<----------a'----------> <----------a'----------> <----------15'----------> <----------15'----------> <---5'---> <---5'---> **X** **X** **X** **X** **X**

NOTE:

1) Sample the floor of the tank excavation between one and two feet into native soils.

2) Sample the floor of the piping excavation once every ten feet of piping between one and two feet into native soils.

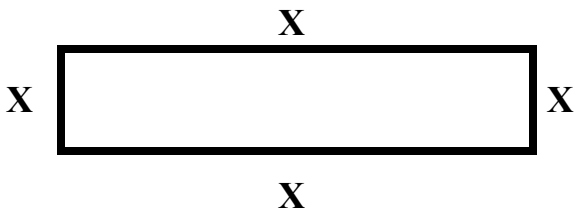
3) If a concrete pad interferes with sampling, sampling will be done according to fill in place requirements. See next page for sampling locations.

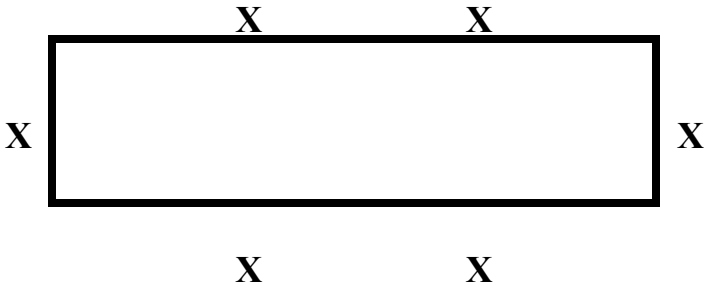
ADDENDUM B

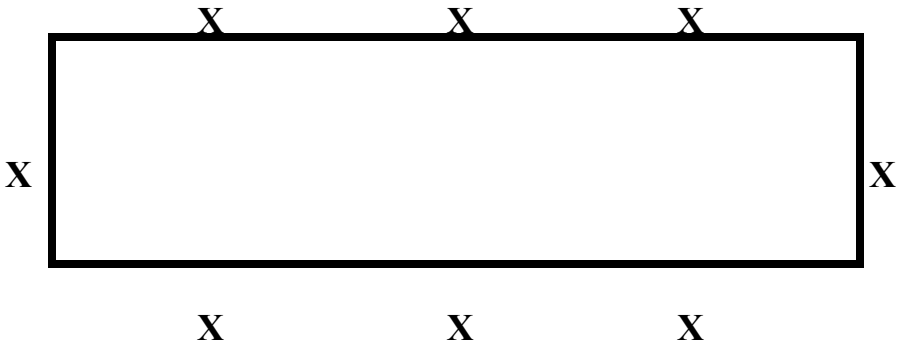
Soil Sample Locations

When a Concrete Pad Interferes with Sampling Beneath UST (Closure in Place)

Tank Capacity (gallons)	# of Samples	Location	Example ("X" location of sample)
6,000 or less	4	one from each end and each side	
6,001 to 12,000	6	one from each end and two from each side	
12,001 or greater	8	one from each end and three from each side	



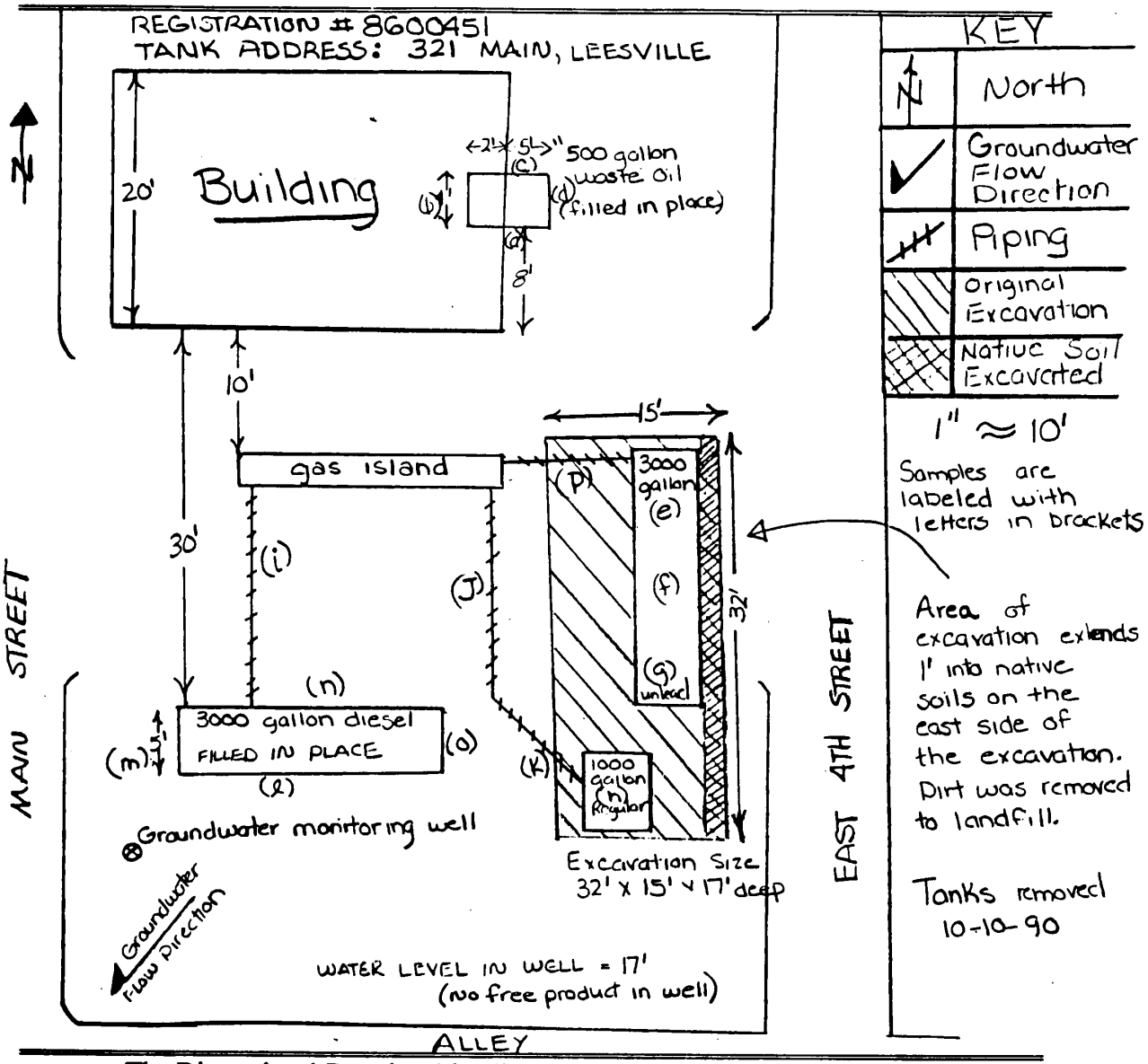




NOTE:
1) Sample between one and two feet into native soils below the pad and the backfill area.
2) Sample once every ten feet of piping between one and two feet into native soils in the floor of the piping excavation or if the piping is not removed, into native soils below piping backfill area.

ADDENDUM B

Example of a Dimensional Drawing (site diagram)



The Dimensional Drawing (site diagram) must indicate the following:

1) **Area which was excavated during the tank closure and extent of native soils removed.**
2) **The length of the interconnecting piping and whether removed.**
3) **Sampling locations that should correspond to laboratory analysis**
4) **Identifiy the tanks and whether removed, closed in place, or still active.**
5) **Buildings, groundwater flow and directions indicated for reference.**

THIS DRAWING DOES NOT NEED TO BE PROFESSIONALLY DRAWN, BUT IT DOES NEED TO BE LEGIBLE AND COMPLETE !

ADDENDUM D

QUALIFICATIONS FOR EXCLUDING GROUNDWATER SAMPLES FOR UST CLOSURES

If groundwater is encountered within ten feet below the lowest level of the tank excavation, a groundwater sample is required. If groundwater is not encountered within ten feet below the lowest level of the tank excavation, but sands or highly permeable soils are encountered, or there are other indications of potential for groundwater contamination, a groundwater sample or samples are required. See Section II, Part 2 on page 6 of this guidance document.

CONDITIONS FOR EXCLUSION

If sands or highly permeable soils are not present in a boring located within 20 feet downgradient from the tank excavation and groundwater is not encountered within ten feet below the lowest level of the tank excavation, the certified well contractor's log and the results of a hydraulic conductivity test must be submitted with the closure report to the DNR. The hydraulic conductivity test must be conducted by a person knowledgeable in the performance and interpretation of such testing. The results of the test must indicate a conductivity rate less than 0.3 meter per day in order to exclude the groundwater sample requirement.

A hydraulic conductivity test, using a Geulph permeameter or an equivalent in situ constant head permeameter in a boring which terminates above the water table and ten feet below the lowest level of the tank excavation is acceptable. If laboratory methods are used, collect undisturbed soil samples using a thin-walled tube sampler in accordance with the American Society of Testing and Materials (ASTM) Standard D1587. Samples shall be clearly marked, preserved and transported to the laboratory. The laboratory shall measure hydraulic conductivity using a constant-head permeameter in accordance with ASTM Standard D2434 or a falling-head permeameter in accordance with acceptable methodology.

DEFINITION OF HIGHLY PERMEABLE SOILS

Sands and highly permeable soils for the purposes of UST closures are defined as:

I. Soil materials classified by the Iowa Geological Survey Bureau as follows:
- a) **(CGg)** clean well sorted gravel greater than 0.25 inches in diameter
- b) **(CGs)** gravel with minor amounts of sand
- c) **(CGc)** clean sand
- d) **(CGp)** sand with minor amounts of pebbles or gravel

II. Vulnerable bedrock

III. Any soils having a hydraulic conductivity rate greater than 0.3 meter per day

ADDENDUM E

ENCOUNTERING BEDROCK DURING GROUNDWATER SAMPLING FOR TANK CLOSURE

CERTIFIED WELL DRILLER AND GROUNDWATER PROFESSIONAL REQUIRED

For all tank closures, a groundwater sample is required from the first saturated groundwater zone. The monitoring well or boring must be positioned downgradient, outside of the tank pit, and not farther than 20 feet from the tank pit. If the top of the water table is suspected to be within bedrock or if bedrock is encountered before groundwater during drilling activity, a certified well contractor must conduct the drilling and a certified groundwater professional must conduct the assessment and sampling activity.

BEDROCK ASSESSMENT

If bedrock is encountered before groundwater, special assessment procedures must be followed. Caution must be taken to avoid creating a conduit for contaminants to reach a bedrock aquifer by drilling through contaminated soils above bedrock.

FIELD SCREENING FOR CONTAMINATION

The groundwater professional must first identify the presence of petroleum contamination in the soil (overburden) through the use of field screening methods (e.g., PID, FID, GC) in order to reduce the risk of spreading contamination to the bedrock aquifer and to determine an appropriate drilling method and monitoring well construction technique. If field screening indicates contamination in the overburden, the most contaminated soil should be determined and selected for lab analysis. Owners and operators must report to the department the discovery of a release in accordance with 135.6.

TIER 2 ASSESSMENT

If contamination in the overburden exceeds Tier 1 levels, a Tier 2 assessment will be required. Owners and operators have the option of conducting a Tier 2 assessment rather than proceeding with the installation of a monitoring well for tank closure.

WHEN BEDROCK CONTAMINATION IS SUSPECTED

If the use of field screening indicates the presence of contamination in the overburden, the overburden must be isolated from the bedrock by installing a permanent casing before continuing drilling, sealing all the casing string with grout seal and seating the casing in the bedrock. Installation of a grout seal around all of the casing in the overburden and seating the casing in the bedrock should ensure the well will remain free of petroleum contamination. The casing should be set and all equipment removed and cleaned before continuing to drill to water.

The bedrock cuttings should be continuously screened for the presence of contamination. The bedrock boring may be cased or uncased depending on the friability of the bedrock material. After the first saturated groundwater zone is encountered, either a temporary well or permanent well may be installed and a water sample collected for lab analysis.

CONTAMINATION IN THE OVERBURDEN WITH A CONFINING UNIT

If while drilling into bedrock a substantial confining layer of material (e.g., shale) is encountered before groundwater, drilling should cease. The confining layer should trap groundwater as well as contamination from a release in the UST system. Construct a temporary well above the confining unit to collect a groundwater sample for lab analysis.

NO CONTAMINATION IN THE OVERBURDEN

When the presence of contamination in the overburden is not identified through field screening or analysis, an uncased groundwater monitoring well may be constructed, and a water sample from the bedrock aquifer may be collected for lab analysis.

USTs SET IN BEDROCK

If the UST is resting on bedrock, examine the tank pit for petroleum staining. If petroleum staining is present, remove all backfill material. If the base of the tank pit is bedrock, but the sidewalls are not bedrock and staining is present in the UST pit, collect a soil sample from each of the sidewalls (nearest the bedrock surface). Use field screening methods to locate the presence of contamination in the tank pit.

SUMMARY

Before a groundwater monitoring well is constructed in bedrock, a certified groundwater professional must evaluate the subsurface conditions of the UST site. The purpose of the evaluation is to determine the potential for product migration and groundwater contamination. Some of the geologic information necessary for an assessment will be difficult to know in advance. Therefore, a full assessment of the bedrock conditions may not be known until after the drilling is completed. The evaluation should contain the following information:

1. Type of bedrock
2. The competence of bedrock (if available)
3. A description of the potential for karst development at the site (if available)
4. The presence or absence of water in the tank pit and the water source
5. The depth to groundwater (if available)
6. The direction of groundwater flow (based on topography and knowledge of local geology)
7. A description of the stratigraphy present in the area, i.e., surficial aquifers vs. deeper aquifers, etc.

CLOSURE REPORT

The above geologic information should be included in the closure report along with the items on pages 9-10.

PLUGGING ABANDONED WELLS

All abandoned wells and borings that access groundwater must be plugged according to 567-Chapter 39. DNR Form 542-1226 must be completed and submitted to the department.

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AFFIDAVIT

January 1, 1974 Exclusion

STATE OF IOWA
ss:
COUNTY OF _____

I, _____, being duly sworn state the following to be true and correct to the best of my knowledge:

1) I am the owner of _____ underground storage tanks as defined by Iowa code section 455b.471(6) located at the address of _____ in the ____ quarter of section _____, township _____, range_____ East/West,

2) That these tanks were taken out of operation prior to January 1, 1974,

3) That these tanks have not contained a regulated substance since January 1, 1974,

4) That these tanks do not currently contain an accumulation of a regulated substance, and

5) The execution of this instrument is my voluntary act and deed.

Subscribed and sworn to before me, _____, a Notary Public in and for the State of Iowa, on this _____ day of _____ 19_____.

_____ (SEAL)
Notary Public

My commission expires _____.

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AFFIDAVIT

Monitoring Records Used In Lieu of Soil & Water Sampling

STATE OF IOWA
ss:
COUNTY OF _____

I, _____, being duly sworn state the following to be true and correct to the best of my knowledge:

1) Approved leak detection as defined by Iowa code section 455b.135(5), is present on the underground storage tanks located at (address)_____ in the ____ quarter of section _____, township _____, range_____ East/West,

2) That the leak detection has been in proper operating condition since _____(DATE)_____.

3) That the leak detection has been in operation since _____(DATE)_____.

4) That there has been no indication of a release at this site, and

5) The execution of this instrument is my voluntary act and deed.

Subscribed and sworn to before me, _____, a Notary Public in and for the State of Iowa, on this _____ day of _____ 19_____.

_____ (SEAL)
Notary Public

My commission expires _____.